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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/728,150

12/03/2003

Jin-Yuan Lee

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6802

27765

7590

06/13/2006

NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION

P.O. BOX 506

MERRIFIELD, VA 22116

EXAMINER

THAI, LUAN C

ART UNIT

PAPER NUMBER

2891

DATE MAILED: 06/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/728,150

Applicant(s)

LEE ET AL.

Examiner

Luan Thai

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 231-237, 239, 240 and 243-279 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 231-237, 239, 240 and 243-279 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 December 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 10/055,499.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office action is responsive to the amendment filed April 19, 2006.

Claims 231-237, 239-240, 243-279 are pending in this application.

Claims 1-230, 238, 241-242, and 280-319 have been canceled.

Drawings

1. The drawings were objected to under 37 CFR 1.83(a) in the previous Office Action, mailed January 19, 2006, and now repeated.

The drawings (*e.g., Figs. 1A-1I of Embodiment I as being elected*) must show every feature of the invention specified in the claims. Therefore, the recitation "*a passive device*" in claims 231-240 and 243-279 and the recitations "*an insulation layer over said passive device*" in claims 255-258, must be shown (*in the elected Embodiment I of Figures 1A-1I*) or the feature(s) canceled from the claim(s). No new matter should be entered.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 277 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In amended claim 277, the new recitation "*said passive device is not over said first die*" is still unclear, confused and not understood. Since independent claim 231 recites "*a first die having a top surface at a horizontal level*" and "*a passive device over said horizontal level*", how can be the passive

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device not over said first die, as recited in dependent claim 277? Note that there is not any “passive device” being shown in the elected embodiment I of figures 1A-1I.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 231, 232, 239-240, 243, 247, 251, 259-260, 264-265, 267-270, and 278-279 are rejected under 35 U.S.C. 102(b) as being anticipated by Eichelberger (6,159,767 of record) as set forth in the previous Office Action mailed January 19, 2006 and now repeated with some modification in an effort to even more clearly clarify the Office Action.

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 231, 232, 243, 247, 251, 259-260, 264-265, 267-270, and 278-279, Eichelberger (see specifically figures 5-6) discloses a circuitry component comprising: a plurality of dies (102) having conductive pads (107) on a top surface, which is at a horizontal level (103’); a bottommost metal layer (110, see Fig. 5e) over the horizontal level and extending to a place not over one of the dies (102) (if the left die 102 in Fig. 6 is considered as the claimed first die), wherein the bottommost metal layer (110) comprises a portion connecting to the

internal circuits of the die (102) via pads (107), electronic component (220) over the horizontal level. Since Eichelberger defines chips (102) as being “*active IC chips*” (Col. 12, line 2, line 11, and line 15+), the *electronic component* (220) connected to the active chips (102) is considered as a passive device (not active device); a substrate (210) joined with the die (102) and being under the horizontal level (see Fig. 6). Eichelberger further discloses an insulating layer (106) between the bottommost metal layer (110) and the horizontal level (103’); another insulating layer (106) over the bottommost metal layer (110) and between the electronic component (220), which is considered as passive device, and the horizontal level (103’); a film layer (104) of UVE-1006 (considered as epoxy) around the die (102) having a surface coplanar with an active surface of the die (102). Eichelberger further discloses at least a bump (152/154) (see figures 5g-5h) comprising solder or gold (Col. 11, lines 35+).

Regarding claims 239-240, Eichelberger discloses the claimed invention as detailed above except for the process of forming the substrate (e.g., “*forming the substrate comprising pressing or injection molding*”).

Although Eichelberger does not specifying the process of forming the substrate as applicant claimed, this limitation is taken to be a product by process limitation, and it is the patentability of the claimed product and not of recited process steps, which must be established. Therefore, when the prior art discloses a product, which reasonably appears to be identical with or only slightly different than the product claimed in a product-by process claim, a rejection based on sections 102 or 103 is fair. A product by process claim directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See *In re Fessman*, 180 USPQ 324,326(CCPA 1974); *In re Marosi et al.*, 218 USPQ 289,292 (Fed. Cir. 1983); and

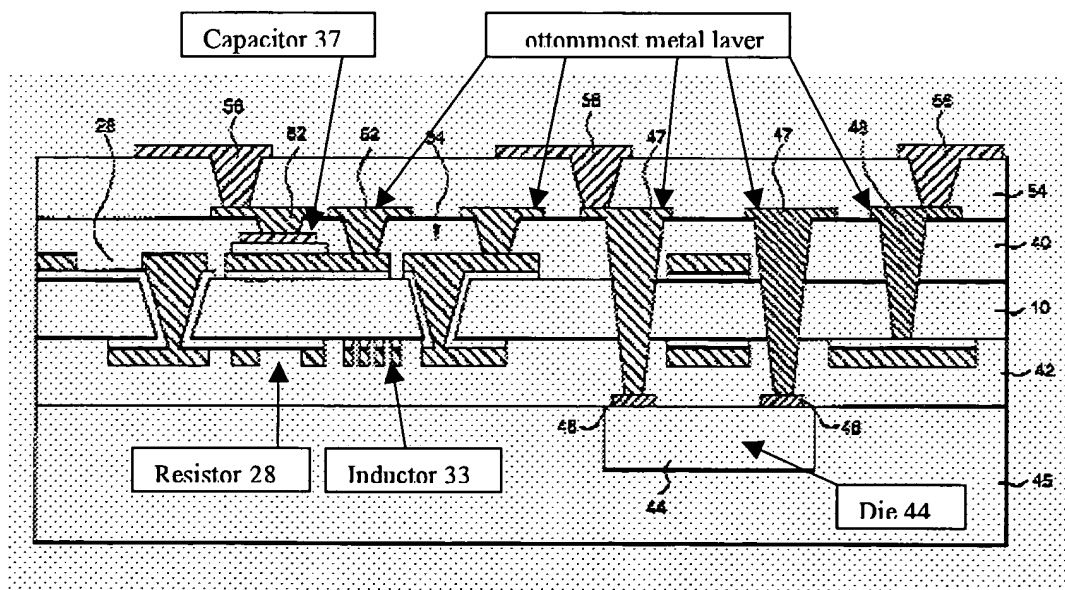
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particularly In re Thorpe, 227 USPQ 964,966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product “gleaned” from the process steps, which must be determined in a “product by process” claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claim in “product by process” claim or not.

6. Claims 231-232, 236, 239-240, 243-244, 247-248, 251-252, 255-256, 259-260, 264, 271-273, and 277-279 are rejected under 35 U.S.C. 102(b) as being anticipated by Saia et al (5,874,770 of record) as set forth in the previous Office Action mailed January 19, 2006 and now repeated with some modification in an effort to even more clearly clarify the Office Action.

The figures and reference numbers referred to in this office action are used merely to indicate an example of a specific teaching and are not to be taken as limiting.

Regarding claims 231-232, 236, 243-244, 247-248, 251-252, 255-256, 259-260, 264, 271-273, and 277-279, Saia et al (see specifically figures see specifically figures 7-8 and 11-12)



disclose an electric component comprising: a plurality of dies (44) (Col. 7, lines 9+) having conductive pads (46) on a top surface, which is at a horizontal level; a bottommost metal layer (e.g., the metal layer portions formed on the insulation layer 40 and having other portions 47-48-52 extended to chip pads 46 of die 44, interconnect area 38, and capacitor 37, respectively, see figures 7-8 and figure 12 attached above) over the horizontal level and extending to a place not over the die (44); passive devices including resistor (28), capacitor (37), and inductor (33) electrically connected to the integrated circuit die (see figures 7 and 12, Col. 6, lines 30-64); a substrate (45) made of plastic joined with the die (44) and being under the horizontal level (see Fig. 6 and Fig. 12 attached above); an insulating layer (40) made of polyimide (Col. 7, lines 1+) between the bottommost metal layer and the horizontal level; another insulating layer (54) made of polyimide (Col. 7, lines 66+ and Col. 8, lines 1-8) over the bottommost metal layer, another insulating layer (42) made of thermoplastic, polymer, or polyimide (Col. 7, lines 13+) between the passive device and the horizontal level. Noted that Saia et al. also disclose the method of forming the metallization layers on each of insulation layers and the metallization layers have portions extending through the vias to coupled the other metallization layers, other passive devices and die (Col. 4, line 58 to Col. 8, line 18).

Regarding claims 239-240, Saia et al, discloses the claimed invention as detailed above except for specifying the process (e.g., pressing, or injection molding) of making the substrate.

Although Saia et al does not teach the process of forming the substrate, this limitation is taken to be a product by process limitation, and it is the patentability of the claimed product and not of recited process steps, which must be established. Therefore, when the prior art discloses a product, which reasonably appears to be identical with or only slightly different than the product

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claimed in a product-by process claim, a rejection based on sections 102 or 103 is fair. A product by process claim directed to the product per se, no matter how actually made, *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See *In re Fessman*, 180 USPQ 324,326(CCPA 1974); *In re Marosi et al.*, 218 USPQ 289,292 (Fed. Cir. 1983); and particularly *In re Thorpe*, 227 USPQ 964,966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product “gleaned” from the process steps, which must be determined in a “product by process” claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claim in “product by process” claim or not.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 233-237, 244-246, 248-250, 252-254 and 266 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eichelberger (6,159,767 of record) in view of Foster et al. (6,603,072 of record) and/or Yuyama et al. (6,620,513 of record) as set forth in the previous Office Action mailed January 19, 2006 and now repeated with some modification in an effort to even more clearly clarify the Office Action.

Regarding claims 233-237, 244-246, 248-250, 252-254, and 266, Eichelberger discloses the claimed invention as detailed above except for specifying the dielectric materials (e.g., *polyimide, polymer, resin, or plastic*) of the substrate or of the insulating layer above the die.

The claimed material, such as polyimide, polymer, resin, or plastic, are known and commonly used in the art for making a substrate or insulating layers of a printed circuit board as disclosed by Foster et al. (Col. 2, lines 64+) and/or Yuyama et al. (Col. 1, lines 11+).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to select a known material (e.g., polyimide, polymer, resin, or plastic) for forming the insulating layers in the printed circuit board or forming the substrate in Eichelberger component since such materials provide good insulation and low cost. The further citation in claims 245-246, 249-250, 253-254, and 266 regarding insulation or dielectric materials of making the substrate (e.g., printed circuit board) or insulating layers of a printed circuit board would have also been obvious for similar reasons set forth above.

9. Claims 261-263 and 271-276 are rejected under 35 U.S.C. 103(a) as being unpatentable over Eichelberger (6,159,767 of record) as set forth in the previous Office Action mailed January 19, 2006 and now repeated with some modification in an effort to even more clearly clarify the Office Action.

Regarding claims 261-263, Eichelberger discloses the claimed invention as detailed above except for specifying the function of the "metal layer connected to the die" (e.g., to transmit a signal, provide a power voltage, or provide a ground voltage).

Although Eichelberger does not specify the function of the metal layer connected to the die, it would have been inherently included, however, if not, it would have been obvious for the metal layer connected to the die for transmitting a signal, provide a power voltage, or a ground voltage for the die to function as intended.

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Regarding claims 271-276, Eichelberger discloses the claimed invention as detailed above except for specifying the passive device comprising a capacitor, a resistor, an inductor, a filter, a waveguide, or a micro electronic mechanical sensor (MEMS).

Eichelberger, however, does disclose:

the lower surfaces of chips 102 as required. Finally, surface mount electronic components 220 can be added on both sides of structure 200 for mixed signals applications. This maximizes the number of components 220 which can be close to any active IC chips, and minimizes the overall volume required for a given interconnect structure.

and it would have been obvious to one of ordinary skill in the art to recognize that “electronic components”, as disclosed by Eichelberger, means any passive devices, such as been capacitor, resistor, inductor, filter, waveguide, or micro electronic mechanical sensor, which are added to both side of structure (200) (see Fig. 6) and connected to the active IC chips for mixed signals applications. Moreover, Applicant’s claimed structures in claims 271-276 do not distinguish over the Eichelberger electric component and it has been held that a recitation (e.g., a capacitor, a resistor, an inductor, a waveguide, a filter, or a MEMS) with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex Parte Masham*, 2 USPQ F.2d 1647 (1987).

Therefore, it would have been obvious to one of ordinary skill in the art to have Eichelberger device structure to include active and passive components comprising at least a capacitor, a resistor, an inductor, a waveguide, a filter, or a MEMS as claimed, since such

employed components do not differentiate the claimed apparatus from Eichelberger device structure.

10. Claims 233-235, 237, 245-246, 249-250, 253-254, and 257-258 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saia et al (5,874,770 of record) in view of Foster et al. (6,603,072 of record) and/or Yuyama et al. (6,620,513 of record) as set forth in the previous Office Action mailed January 19, 2006 and now repeated with some modification in an effort to even more clearly clarify the Office Action.

Regarding claims 233-235, 237, 245-246, 249-250, 253-254, and 257-258, Saia et al discloses the claimed invention as detailed above except for specifying the materials (e.g., polyimide, polymer, resin or thermosetting plastic) making the substrate or the insulating layer between the metal circuit above the die.

However, the claimed material, such as polyimide, polymer, resin, or thermosetting plastic, are known and commonly used in the art for making a substrate or insulating layers of a printed circuit board as disclosed by Foster et al. (Col. 2, lines 64+) and/or by Yuyama et al. (Col. 1, lines 11+).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to select a known material (e.g., polyimide, polymer, resin, or thermosetting plastic) for forming the insulating layers in the printed circuit board or the substrate of Saia et al component since such materials provide good insulation and low cost. The further citation in claims 245-246, 249-250, and 253-254, regarding materials of making the substrate (e.g., the circuit board) or insulating layers of the circuit board above the die would have also been obvious for similar reasons set forth above.

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11. Claims 261-263 and 274-276 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saia et al (5,874,770 of record) as set forth in the previous Office Action mailed January 19, 2006 and now repeated with some modification in an effort to even more clearly clarify the Office Action.

Regarding claims 261-263, Saia et al discloses the claimed invention as detailed above except for specifying a function of the “metal layer connected to the die” (e.g., to transmit a signal, provide a power voltage, or provide a ground voltage). Although Saia et al does not specify the function of the metal layer connected to the die, it would have been inherently included, however, if not, it would have been obvious for the metal layer connected to the die for transmitting a signal, provide a power voltage, or a ground voltage for the die to function as intended.

Regarding claims 274-276, Saia et al discloses the claimed invention as detailed above except for specifying the passive device comprising a filter, a waveguide, or a micro electronic mechanical sensor (MEMS).

Applicant's claimed structures in claims 274-276 do not distinguish over the Saia et al electric component and it has been held that a recitation (e.g., a waveguide, a filter, or a MEMS) with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural limitations. *Ex Parte Masham*, 2 USPQ F.2d 1647 (1987).

Therefore, it would have been obvious to one of ordinary skill in the art to have Saia et al device structure to include active and passive components comprising at least a

waveguide, a filter, or a MEMS as claimed, since such employed components do not differentiate the claimed apparatus from Saia et al device structure.

Response to Arguments

12. Applicant's arguments filed on 4/19/06 have been fully considered but they are not persuasive. Specifically:

a) Regarding the Objection, Applicant argues in page 3 of the Remarks, that

The recitation of "a passive device" in claims 231-240 and 243-279 is shown in Figs. 6 and 7 and indicated by a reference number of "644". The recitation of "die portion" in claims 261-263 is amended to "portion", and shown in Fig. 8. The recitation of "an insulating layer over said passive device" in claims 255-258 is shown in Figs. 6 and 7. Withdrawal of the objection is respectfully requested.

However, Applicant, in response to the Restriction Requirement mailed on 10/19/05, had elected the Embodiment I of Figures 1A-1I, filed 11/18/05, and there are not any "passive device" being shown in figures 1A-1I that belongs to the elected Embodiment I.

b) Applicant argues in page 11 of the Remarks that Eichelberger does not teach, hint or suggest "a passive device" over the horizontal level, and that the electronic components (220) shown in Eichelberger's figure 6 is not a passive device. In response, the Examiner points out that Eichelberger's figure 6 (Col. 11, line 60 to Col. 12, line17) discloses chip (or die) 102 being defined as "*active IC chip*" and reference number 220 as "*electronic component*" "*added to the structure for mixed signals applications*". Since *electronic component 220* is not defined as a, active device, it must be implied a passive component or a passive device.

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c) Applicant argues in page 12 of the Remarks that Saia reference fails to teach, hint or suggest the claimed “bottommost metal layer” and that reference numbers 47, 48, and 52 are vias. In response, the Examiner points out that Saia reference does teach (see figure 12 attached above) a metal layer (considered as the claimed “bottommost metal layer”), which is formed on the insulation layer 40 and having other portions 47-48-52 extended to chip pads 46 of die 44, interconnect area 38, and capacitor 37, respectively, see figures 7-8 and figures 11-12 attached above, Col. 7, lines 39-65) over the horizontal level and extending to a place not over the die (44); passive devices including resistor (28), capacitor (37), and inductor (33) electrically connected to the integrated circuit die (see figures 7 and 12, Col. 6, lines 30-64). Noted that Saia et al. also disclose the method of forming the metallization layers on each of insulation layers and the metallization layers have portions extending through the vias to coupled the other metallization layers, other passive devices and die (Col. 4, line 58 to Col. 8, line 18).

Conclusion

13 Applicant’s amendment filed on 4/19/06 has been fully considered but they are not persuasive. Therefore, **THIS ACTION IS MADE FINAL**. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period

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will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luan Thai whose telephone number is 571-272-1935. The examiner can normally be reached on 6:30 AM - 5:00 PM, Monday to Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bradley W. Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/



Luan Thai

Primary Examiner

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June 7, 2006